

What is claimed is:

1. A spatial image information system for efficient storage and retrieval of spatial images acquired by an image acquisition device provided with a navigation system, the system comprising:

5 a spatial image query interface component section for performing an interface function for interfacing with an external client, and processing a spatial image database construction query, spatial image retrieval/insertion/deletion queries, and a spatial object information manipulation query in the spatial images;

10 a spatial image meta information component section for managing schema and index information of spatial image sequences, and processing a query about index information if the query about the index information is inputted from the spatial image query interface component section;

15 a spatial image storage/retrieval component section for processing storage, retrieval and management of the spatial image sequences according to the query of the spatial image query interface component section;

20 a spatial image to real coordinate conversion component section for receiving and converting the spatial image and a specified position in the image into a real-world coordinate (x,y,z) or receiving and converting the real-world coordinate (x,y,z) and the spatial image into the specified position in the spatial image according to the query of the spatial image query interface component section; and

25 an open type spatial image database interface component section for storing and managing the spatial images by interfacing the spatial image meta information component section, the spatial image storage/retrieval component section and the spatial image to real coordinate conversion component section with a storage system irrespective of a kind of the storage system.

2. The system of claim 1, wherein a database structure of the spatial image information system comprises:

spatial image sequence tables for storing the spatial images and information;

spatial image object tables for storing information on spatial objects existing in spatial image sequences;

a spatial image sequence information table including schema information and indexes of the spatial image sequences and summary information; and

a spatial image sequence index table for managing indexes so as to promptly retrieve the spatial image sequence tables.

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3. The system of claim 2, wherein the spatial image sequence information table comprises a camera type (CameraType) column for indicating whether the image acquisition device is a general camera for acquiring snapshot images or a video type sequential spatial image acquisition camera, a camera number (NumOfCameras) column for indicating the number of cameras used for the image acquisition in the image acquisition device, and an interior orientation (InteriorOrientation) column for storing an interior orientation of a camera lens.

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4. The system of claim 2, wherein the spatial image sequence index table comprises an acquisition start time (fromTime) column for storing the smallest image acquisition time value in the corresponding spatial image sequence, and an acquisition end time (toTime) column for storing the largest image acquisition time value in order to enable an efficient retrieval of a spatial image sequence lifetime.

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5. The system of claim 2, wherein the spatial image sequence index table comprises a minimum bounding rectangle (MBR) column for an MBR of a moving path of a camera, a

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camera path (CameraPath) column for heightening a query speed with respect to the moving trace path of the camera by storing the moving trace path of the camera in the form of a line string (LineString) in order to reduce a fault area if filtering is performed using the MBR during the spatial image retrieval by the moving path trace of the camera, and a camera time index (CameraTimeIndex) column for storing time values at vertexes constituting the
5 respective camera path in order to enable an efficient retrieval of position information of the spatial image acquisition camera without retrieving the spatial image sequence table.

6. The system of claim 2, wherein the spatial image sequence index table has a
10 sequence index type (SequenceIndexType) column so as to apply diverse kinds of filtering types to a sequence index for efficiently retrieving of what area the spatial image sequence in the spatial image information system includes spatial information.

7. The system of claim 6, wherein the spatial image sequence index table stores a
15 spatial information area included in the spatial image sequence in the form of an MBR in the spatial image sequence index table so as to efficiently perform a view spatial area of the spatial image sequence.

8. The system of claim 6, wherein the spatial image sequence index table stores a
20 spatial information area included in the spatial image sequence in the form of a convex hull so as to efficiently perform a view spatial area of the spatial image sequence.

9. The system of claim 6, wherein the spatial image sequence index table stores a
spatial information area included in the spatial image sequence in the form of a buffered value
25 with respect to a moving trace of a camera so as to efficiently perform a view spatial area of the spatial image sequence.

10. The system of claim 2, wherein the spatial image sequence index table comprises a view area type (ViewAreaType) column for writing a type of a view area (ViewArea) of a spatial image in the spatial image information system, and a view area index
5 (ViewAreaIndex) column for storing a list of view area (ViewArea) values of a real spatial image sequence, so that the retrieval is performed irrespective of the type of the view area (ViewArea).

11. The system of claim 10, wherein the spatial image sequence index table simplifies
10 and stores the view area (ViewArea) of the respective spatial image in the spatial image sequence in the form of a 2-dimensional MBR area.

12. The system of claim 10, wherein the spatial image sequence index table simplifies
and stores the view area (ViewArea) of the respective spatial image in the spatial image
15 sequence in the form of a 2-dimensional triangle area.

13. The system of claim 10, wherein the spatial image sequence index table simplifies
and stores the view area (ViewArea) of the respective spatial image in the spatial image
sequence in the form of a 3-dimensional pyramid with a camera mounted thereon.

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14. A method for retrieving spatial images including a designated area in a spatial
image information system for storing the spatial images acquired by an image acquisition
device provided with a navigation system using a database structure composed of spatial
image sequence tables for storing the spatial images and information, spatial image object
25 tables for storing information on spatial objects existing in spatial image sequences, a spatial
image sequence information table including schema information and indexes of the spatial

image sequences and summary information, and a spatial image sequence index table for managing indexes so as to promptly retrieve the spatial image sequence tables, the method comprising:

5 a spatial image sequence filtering step of retrieving the spatial image sequences including the designated area using the spatial image sequence indexes of the spatial image sequence index table;

a spatial image filtering step of retrieving the spatial images including the designated area with respect to the spatial image sequences retrieved at the spatial image sequence filtering step; and

10 a spatial image refining step of checking whether a real spatial image includes the designated area by loading the spatial images, which are retrieved at the spatial image filtering step, from the spatial image sequence tables.

15 15. The method of claim 14, further comprising:

if a retrieval range is limited to a retrieval of a specified spatial image sequence when the retrieval is requested, a spatial image filtering step of retrieving the spatial images including the designated area with respect to the specified spatial image sequence; and

a spatial image refining step of checking whether a real spatial image includes the designated area by loading the spatial images, which are retrieved at the spatial image filtering step, from the specified spatial image sequence table.

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